**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

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|  | **4BT7190** | Roll No. | Total Printed Pages: 2 |
| **4BT7190** |  |
| B. Tech. IV Year VII- Semester (Main/Back) End Semester Examination, November 2022  **(EC)** | |
| **BEC07104 : Satellite Communication** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | Explain Keppler’s law for Satellite Communication. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Discuss various types of satellites. | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | A satellite is in an elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Using a mean earth radius of 6378.14 km, determine the period of the orbit in hours, minutes, and seconds, and the eccentricity of the orbit | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  | **(b)** | Explain Look Angle, Azimuth angle and Elevation angle calculation. | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
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| **Q.3** | **(a)** | What is the relevance of Stabilization? Explain the methods of Stabilization related to spacecraft/satellite. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Describe Communication Payload and Supporting Subsystems. | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.4** | **(a)** | Explain the power requirements of satellite subsystem. Also draw the basic satellite power system block. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Draw the block diagram telemetry, tracking and command (tt & c). | **(6)** | **Apply** |
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|  |  | **UNIT-III (CO3)** |  |  |
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| **Q.5** | **(a)** | A satellite at a distance of 40 000 km from a point on the earth’s surface radiates a power of 10 W from an antenna with a gain of 17 dB in the direction of the observer. Find the flux density at the receiving point, and the power received by an earth station antenna at this point with an effective area of 10 m2. | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  | **(b)** | Explain Earth station receivers with diagrams | **(6)** | **Analyze** |
|  |  | **OR** |  |  |
| **Q.6** | **(a)** | An earth station antenna has a diameter of 30 m with an aperture efficiency of 68% and is used to receive a signal at 4150 MHz. At this frequency, the system noise temperature is 60 K when the antenna points at the satellite at an elevation angle of 28°. What is the earth station G/T ratio under these conditions? If heavy rain causes the sky temperature to increase so that the system noise temperature rises to 88 K, what is the new G/T value? | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  | **(b)** | Explain the System Noise Temperature and Noise Figure. | **(6)** | **Analyze** |
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|  |  | **UNIT-IV (CO4)** |  |  |
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| **Q.7** | **(a)** | Explain the working, advantage and disadvantage of CDMA system. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Compare the FDMA, TDMA and CDMA. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.8** | **(a)** | Describe FDMA transmitter and receiver with its diagrams. | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | Explain TDMA frame structure. | **(6)** | **Analyze** |
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|  |  | **UNIT V (CO5)** |  |  |
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| **Q.9** | **(a)** | Explain INTELSAT series with its type and various characteristics. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Draw and explain the block diagram of VSAT. | **(6)** | **Apply** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.10** | **(a)** | Describe GSM services and architecture used in Mobile Satellite Services. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Explain GPS with its different segments. Also explain advantages and disadvantages of GPS. | **(6)** | **Analyze** |